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And The Fight Against It

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THE BEET MOTH AND THE FIGHT AGAINST IT

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This very dangerous enemy of beet crops is comparatively new in Bulgaria. It was first discovered here by Professor Popov in 1938. Since then it has spread over almost the entire country. Most favorable to its reproduction are the dry years such as those which have lately plagued Bulgaria. In the summer of 1950 this menace assumed such proportions as to inflict, in conjunction with the drought, record damage. Particularly hard hit were the sugar beet and mangel-wurzel stecklings in the main seed-producing centers: Kolarovgrad, Novi Pazar, and Pleven rayons. In some places in these rayons, the stecklings suffered almost 100 percent damage, and this led to a scant 50 percent fulfillment of the plan for steckling production. The country found itself faced with the prospect of not having enough seed for the following year. This made it necessary to select and set aside for seed production some 2000 tons of industrial sugar beet from rayons in which the attacks of the beet moth had been comparatively slight.

The industrial sugar beet losses were equally heavy. In some rayons the roots were turned into veritable sieves by the many caterpillars: we counted over 120 of them in a single root, in which the top third in particular resembled a sponge. Such roots, of course, could not store enough sugar. In addition, the holes bored by the caterpillars are filled with excretory matter, which adds difficulties to the production of sugar. This, together with the softening of the roots caused by the drought, has caused a 50 percent reduction in the production of sugar per 24-hour period in the fac-

tories.

The beet moth also inflicted serious damage on the mangel-wirzel crop, intended for animal fodder. Because of the heavy damage, the affected roots were unable to endure prolonged winter storage, for the tunnels bored in them by the caterpillars became natural avenues for the invasion of soil moulds which caused the buried fodder to rot. Many State Farms and Farm Workers' Cooperatives lost hundreds of tons of mangel-wurzel in this way. The salad beet was no less affected. The roots, pierced by many tunnels and filled with excretory matter, had little market value as market goods. Only the seedlings were almost untouched by the beet moth last year.

The beet moth measures about 10 to 12 millimeters across the wings, the front wings being ashen-grey to dark brown. The trailing edge of the wings is of a lighter brown, and when the wings are folded a light brown band running lengthwise is clearly visible.

The moth spends the winter as a grown larva or chrysalis in the ground and in the remains of beet plants or in the beet roots in the storage pits. In early spring, as soon as the fodder pits are uncovered, the first moths may be observed. They deposit their eggs on the leaves (mainly along the central nerve) of the seedlings, which serve as the first home for the caterpillars of the first generation. When hatched, the larvae eat their way into the leaves and feed away, hidden in the tunnels which they have bored, which they fill with their excretions. At the same time, the caterpillars spin silk threads, with which they cover the attacked areas. In the case of the seedlings, soon after the formation of the flower

stems, the larvae of the first generation attack the buds before efflorescence and then, after surrounding them with a web, they proceed to eat into them. The first generation has a rather long duration, and the last moths even deposit their eggs on the regular beet crops -- the industrial sugar beet, the mangelwurzel (for fodder), the beet stecklings, and the salad beet. The caterpillars when hatched eat their way into the leaves and follow mainly along the central nerve of the leaf and thus reach the root. Very frequently caterpillars are found on the petura of the leaf itself. As they increase in numbers, the caterpillars advance to the center of the rosette formed by the leaves and, imbedded therein, they attack the stems of the leaves, causing the latter to wilt. Last year, towards the end of the summer, when, as was stated above, many caterpillars were found in one plant, the damaged plants usually had very few healthy leaves left, and their center formed a black ball, wrapped in webs and excretions. Quite naturally, such roots were unable to form and accumulate anywhere near normal sugar reserves.

In other years when the attack was heavy, damage was usually restricted to the upper section of the root. During 1950, however, at the beginning of August, perhaps because of the unusually severe drought, the caterpillars began to move en masse into the part of the root lying underground, first boring their tunnels immediately under the skin and later burrowing a few centimeters into the interior. This behavior, which had not been observed here previously and which was obviously dictated by environmental conditions, wrought the greatest damage yet recorded in this country.

The beet moth has several overlapping generations in the course of a year. Thus all the stages of the insect -- egg, larva (caterpillar), chrysalis, and moth -- may be observed at the same time in one place. The continuous growth of the harmful stage (larva) adds extra difficulties to the fight against this dangerous enemy of the beet industry.

However, even though difficult, the fight against the beet moth is far from impossible. The experiments conducted at five places in the country last year on stecklings and the matochno beet (at Podem, Pleven Okoliya, and Tsarev Brod, Kolarovgrad Okoliya), the technical sugar beet (Yasen, Pleven Okoliya, and Kameno, Burgas Okoliya), and the mangel-wurzel at the experimental station of the Central Agricultural Research Institute, Gorni Lozen village, Sofia Okoliya, showed that against such an unprecedented attack three treatments of the beet crops gave good results. Whereas in the untreated sections 50 to 60 caterpillars were counted per root, on the average, the average for the treated sections was 1.6, some heads containing none, others up to a maximum of 5. The general appearance of the treated sections was quite normal, while the untreated sections were almost completely wilted and leafless. One fact emerges as very important from the experiments conducted last year: the moths are very easily and strongly affected by the chemicals used: DDT, hexachloride, and E-605 forte.

The results of these experiments were almost identical for all three preparations. However, since the beet crops where attacked at the same time by the second generation of the beet flea during the summer, particularly at Kameno village, Burgas okoliya, the plots treated with 7-percent DDT for dusting, hexachloride, and

20-percent DDT for spraying in a 1-percent solution were in much better condition both as to the leaf mass and the yield. This is due to the fact that E-605 forte has a very short-lived effectiveness (five or six days), so that the leaves in the plots treated with it were heavily damaged by the fleas, while hexachloride, and particularly DDT, continue to be effective for more than 10 to 15 days, so that the leaves in these sections were completely unharmed by the fleas.

Of fundamental importance in carrying on the fight against the beet moth will be the determination of the right time for the first treatment and the following ones (dusting or spraying). This can be achieved by regular observations, at least every five days, on the presence of the moth. Observations must be made on the caterpillars as well as on the frequency of occurrence of the adult moths. Should an average of one to two larvas per plant be observed, as well as considerable activity on the part of the moths, treatment must be carried out immediately. Successive treatments should be undertaken every 15 or 20 days.

This year the Plant Protection Section of the Ministry of Agriculture will organize observation posts in the beet-growing districts and will announce the times for treatment.

The treatment itself may be carried out with 7-percent DDT or hexachloride, using 2 to 2.5 kilograms per acre, or a 1-percent solution of 20-percent DDT. If these chemicals are not available, E605 forte may be used effectively in a 0.025-percent solution. However, since the latter is unmatched in the fight against tobacco thrips, it must not be used against the moth but saved for the thrips, since it is an imported product and there are great

exchange difficulties connected with its importation.

Whenever solutions are used in the treatment, 80 to 180 liters should be used per acre, depending on the amount of damage done to the leaves of the beets.

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